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| **POWER OF ATTORNEY OR AUTHORIZATION OF AGENT** | Application Number | Not Yet Assigned |
| | Filing Date | Herewith |
| | First Named Inventor | Brian Whitman |
| | Title | Extracting Classifying Data (etc.) |
| | Group Art Unit | Not Yet Assigned |
| | Examiner Name | Not Yet Assigned |
| | Attorney Docket Number | 14855 |

I hereby appoint:

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OR

[ ] Practitioner(s) named below:

| Name | Registration Number |
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as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

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I am the:

[X] Applicant/Inventor.

[ ] Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

### SIGNATURE of Applicant or Assignee of Record

| Name | Gary W. Flake |
|---|---|
| Signature | *(signature)* |
| Date | 8-24-01 |

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

[X] *Total of __3__ forms are submitted.

Please type a plus sign (+) inside this box ➙ [+]

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## SIGNATURE of Applicant or Assignee of Record

| Name | Stephen R. Lawrence |
|---|---|
| Signature | |
| Date | 8/24/2001 |

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

[X] *Total of __3__ forms are submitted.

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| **Group Art Unit** | Not Yet Assigned |
| **Examiner Name** | Not Yet Assigned |
| **Attorney Docket Number** | 14855 |

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*Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).*

### SIGNATURE of Applicant or Assignee of Record

| Name | Brian Whitman |
|---|---|
| Signature | /s/ |
| Date | 8/24/01 |

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

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who wish to find music by a particular artist. It can also be used in converting large sets of music data to the digital domain; instead of manually entering artist information, the system could automatically make the classification. The representation generated by the system of the present invention can also be used as a recommendation agent for content-based music retrieval.

## Brief Description of the Drawings

[0017] These and other features, aspects, and benefits of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings, where like reference numerals refer to like components across the several views:

[0018] Fig. 1 shows the flow path of a Music Classifier according to the present invention.

[0019] Fig. 2 shows the flow path of the Learning Representation Generator according to the present invention.

[0020] Fig. 3 shows the flow path of the multi-stage classifier according to the present invention.

## Detailed Description of the Invention

[0021] Referring to Fig. 1, the system 100 begins by receiving an audio signal from some source 102. The source 102 generates a signal 103 which contains audio content, which can be a recording from CD or other media, a received broadcast, a file that stores the music data, or even input from a live performance. The signal 103 is either re-sampled or directly copied by a Pulse Code Modulation (PCM) encoding circuit 104, which outputs a digital representation of audio signal 103, which is audio bitstream 105.

[0022] Next, the audio bitstream 105 is transformed by a perceptual representation (PR) generator 106 into PR 107. From this PR, a learning representation (LR) generator 108 transforms the PR into LRs 109. The LRs 109 output from the LR generator 108 are input into a multi-stage classifier 110, which after proper training will be capable of distinguishing between a variety of artists to which it